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Agriculture

Electricity on the Farm

February 1929

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FIG.2450

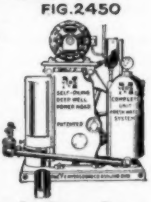

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FIG.2510

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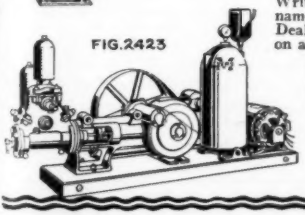
FIG.2423



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Electricity on the Farm

Vol. 2 FEBRUARY 1929 No. 2

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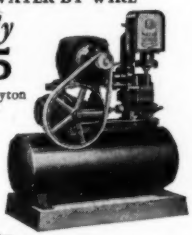

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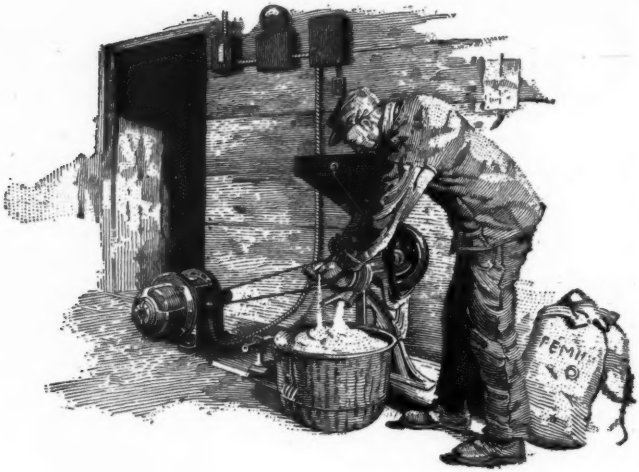

The Electric Mill Saves Mileage and Money

IT SEEMS a small thing to haul feed to the grist mill for grinding and to bring it back again. But mileage means money to the farmer—it is one of the biggest elements in farming costs.

A small motorized grinder will keep the feed bin filled almost automatically. And this is just one way in which G-E motors, control, and other electric equipment are saving money on well-managed farms. For only as the farmer's own time is set free, can the improvements on which his future profits depend be carried out.

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Ask Your Power Company

If you are located on or near an electric power line, ask the power company for complete information concerning the possible uses of electricity on your farm.

GENERAL ELECTRIC

200-119D

Electricity on the Farm

Vol. 2 FEBRUARY 1929 No. 2

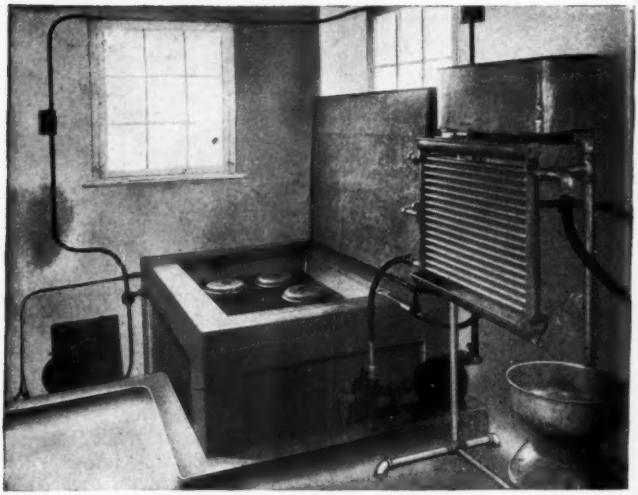
Eliminating the Weeds

The farmer who is content to sow seed grain as harvested from his own farm or as purchased from a neighbor, making no attempt to remove weed seeds therefrom, is planting a lot of unprofitable work for himself. It has been conservatively estimated that the average grain crop contains ten per cent of weeds. If this is true, and there is no reason for assuming otherwise, then when seed from such a crop is planted ten per cent of all work in connection with the new crop, from ploughing right on through harvesting and threshing, is absolutely wasted. It requires time and effort to harvest the weeds just as it does to harvest useful grains. And there are other reasons, too, which make the use of uncleaned grain for seeding unprofitable: for example, the penalty when selling grain where the percentage of weeds is high. Clean grain brings a premium.

Another important argument in connection with clean grain is the fact that weed seeds contain, and retain, a greater proportion of moisture than do useful grains. For this reason, there is a greater chance of the grain becoming musty when weeds are present than when clean grain only is stored.

The modern fanning mill eliminates in a large measure the cause of weed troubles. These machines as now built not only remove the larger percentage of weed seed from the grain, but also remove the trash which frequently proves troublesome by clogging up the drill. With the advent of electricity on the farm all the grind in connection with turning the old fanning mill by hand has vanished. The little electric motor which operates the fanning mill efficiently starts with the closing of a switch. It delivers the uniform speed necessary in obtaining uniform results.

All in all, there is little reason why an electrified farm should ever have to worry about weedy grain.



A factory-built tank for submerging cans, with a surface cooler for quickly reducing the temperature of the milk. A small centrifugal pump is installed to circulate the water through the coils of the surface cooler.

Cooling Milk by Wire

How to Select the Right Outfit for Each Type of Dairy

By F. LA T. BUDGETT and H. C. FULLER

MANY dairymen are turning to the electric method for cooling their milk. They realize the advantages to be gained by better cooling, elimination of hand labor both in filling the ice house and in the daily use of ice, cleanliness, economical and automatic operation. Further, the tendency of modern boards of health is to make more and more stringent regulations as to cooling. Many of these demand that the milk be cooled to 50° F. or less, within one hour after milking. Several types of machine and several methods of operation are possible. It is the purpose of this article to point out the advantages and disadvantages of the various systems, so that the dairyman may choose the right outfit for his particular needs.

Types of Dairy

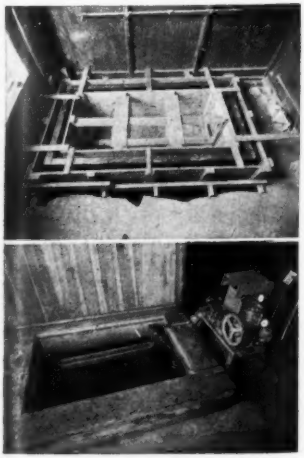
For a dairyman who sells his milk wholesale in cans, usually the best system is what is known as the Submerged Can Method. In this method, refrigerating coils

are installed in a tank of water, the walls of the tank containing corkboard or some other good heat insulation. These coils when connected to the machine cool down the water, and the cans of milk are in turn cooled by submerging them in this water. The dairyman may either purchase his tank readymade (in which case it generally consists of a strong wooden frame filled in with corkboard and covered inside and out with heavy galvanized iron) or he may build it himself of concrete and corkboard. In case it is found necessary to increase the rate of cooling still further, a surface cooler may be installed and a small motor-driven centrifugal pump arranged to force the cold water from the tank through its coils. By passing the milk over these coils, the milk will be more quickly reduced to the desired temperature. The can may then be submerged in the tank until the time of delivery.

For dairymen who are required to pasteurize their milk on the farm, the submerged can and surface cooler system may be used if the milk is to be stored in cans after pasteurization. Of course, a much larger capacity refrigeration machine will be necessary, since the milk has to be cooled from a much higher temperature.

If the milk is to be stored in bottles, it will be necessary to construct a dry storage box instead of the tank. In this case a brine tank is generally installed in the box, and the coils attached to the refrigeration machine are mounted in this tank. The milk is quickly cooled before bottling by passing it over a surface cooler through which the brine is circulated.

If the dairyman wishes to bottle his milk raw, the surface cooler and dry storage method may be used, and it is best to bottle immediately after each milking.



Upper: A simple form for pouring a home-made concrete cooling tank. Notice the cork-board insulation which is placed in the center of the form.

Lower: Completed "Submerged Can Outfit" with air-cooled compressor.

A commercial water-cooled machine with a dry storage-room used for storing milk either before or after bottling.

Use of Well or Spring Water

Dairymen often ask whether they can cool the milk with spring or well water. The difficulty with this is that generally the water is not cold enough to bring the milk down quickly to the desired temperature. However, by using the available water in conjunction with

the electric milk cooler, a very economical outfit is obtained. To do this, the well water is passed through the upper section of a surface cooler, while the refrigerated water or brine is passed through the lower section.

Use of Surface Coolers

In producing milk, extreme care must be taken in every operation to prevent the access and increase of bacteria. For this reason the use of a surface cooler, unless proper facilities are available for sterilizing it, is not recommended. Contamination from a poorly cleansed surface cooler may go far to neutralize the advantages of the rapid cooling which it gives.

Proper sterilization, in general, means more than turning a jet of steam on the utensils for a couple of minutes. The metal or glassware should be heated to about 170° F. and held there for at least fifteen minutes. For sterilization where steam is not available, electric sterilizers, which will take care of surface cooler, pails and bottles, have been developed.

Types of Electric Refrigerating Equipment

The two principal types of refrigerating machines are water-cooled and air-cooled. Generally speaking, a water-cooled machine is more efficient, and should be used wherever enough cooling water is available. The water is not contaminated by passing through the machine, and may be run back into the well if desired. A water-cooled machine should be placed where it will be protected from frost, or else suitable arrangements should be made for draining the water jacket and pipes when not in use.

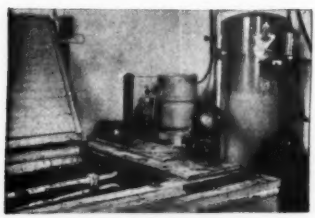
For the larger jobs, a water-cooled machine must be used, because air-cooled machines are not built in large sizes. The use of two air-cooled machines is not recommended, for due to the air-cooling and the smaller size of the machines, they will be less economical to run than a single water-cooled machine of proper size.

For the smaller jobs, an air-cooled machine is quite practical. It has the advantages of needing no water supply and thus being in no danger of freezing.

To ensure satisfaction with electric refrigeration, the dairyman should buy his equipment only from a responsible dealer near at hand, who is familiar with the design and installation of a refrigerating plant, and is equipped to furnish prompt and adequate service.

A final word of caution is advisable. Electric refrigeration is not a cure-all for dirty milk and high bacteria counts. It cannot overcome the handicap of badly kept stables and careless handling of utensils. However, given a clean stable and clean utensils, it will save much labor, and make possible the production of very high grade milk.

* * *



A submerged can cooler with water-cooled compressor. Notice the water-pumping outfit at the right.

"Lighting the Farm Home"

This very instructive and interesting article by Messrs. Brown and Meaker, scheduled for this issue, has been withheld until next month's number. Look for it! There's a lot of helpful data in it.

EDITOR

Cutting

The Weed Tax

By Cleaning Grain

By E. R. MEACHAM

ONE blizzardly day late in March, I stopped at the farm of my good friend Ed Brown to ask him about some barley he was advertising for sale. I found him at his desk poring over a page of figures.

"Sort of figuring up my weed tax," he said, rising to shake hands.

"Your weed tax?" I repeated curiously as I sat down near the register. "What are you talking about?"

"I went to a clean seed meeting at the Institute the other night," said Ed, "and it kind of got me to thinking about this matter of weeds."

He picked up a clipping at his elbow.

With an electric motor grain cleaning becomes an easy one-man job.

"I've been reading about an investigation they carried on over in Minnesota a few years ago. Their survey showed that every planted acre in the areas of their study was growing 9/10 grain and one-tenth weeds. There is no reason to suppose that their fields are any weedier than ours, and I've been starting out with that as a basis for some sort of estimate of what I'm losing right here by raising weeds."

"Sounds like a big job," I answered dubiously. "There's such a lot you'll have to guess at. What good will it do you to figure it up? You've already paid it whether you know how much it is or not."

"Paid a lot of it," Ed agreed. But I'm going to scare myself into really going after this job in earnest. R. H. Black of the United States Department of Agriculture writes in *Agricultural Engineering* that practically all of the weeds now found in the grain in the spring wheat areas were brought into the fields in the seed grain. I'm going to stop that on my farm this very year."

"I thought there were already laws about planting weedy seed," I said.

"Plenty of laws, but they aren't aimed at the farmer's grain bins. And a lot of us plant our own grain, or our neighbor's grain, year after year," Ed answered soberly. "There isn't much use in reading a law over a grain field; I guess us farmers are blinking

at this tax, and it will be levied till we repeal it ourselves.

"And it isn't only the lowered yield we have to face. There's all the extra twine and labor for shocking up the weeds with the grain when they are ripe. "It says here," he turned again to the paper in his hand, "That the spring grain crop is reduced 12 to 15% each year on account of weeds, and a definite study of spring wheat in North Dakota in 1926 showed an average dockage of 9.1%. You've got to admit that besides losing almost a tenth of the possible yield, those farmers paid out 9.1% of the harvesting, threshing, marketing costs just to take care of the weeds."

"Nine per cent," I repeated slowly. "That's losing money pretty fast. And in addition to those things there's no telling how much you lose by spoilage when the stored grain is weedy. Last December I heard D. C. Heitshu of Virginia Polytechnic Institute talk about grain drying experiments in his state. He said that in the bins under observation, the clean grain cured perfectly but where it was badly mixed with weed seed it became quite musty. That weed seed doubtless contained a good deal of moisture when it was harvested and it made the grain heat."

Ed nodded in agreement.

"I have had grain do that. But the part of the tax that I can figure without any difficulty right now today is the dockage on the grain I sell. When I stop to think about it, I can't say that I blame any one very much for that. When my oats are 3% sow thistle or lamb's quarter, or wild buckwheat, I can't rightly expect any one to buy them at the price of good plump oats."

"You're headed into a job of national magnitude," I said, turning over the pile of bulletins and clippings on his desk.

"I know it. I don't imagine for a minute that I'm going to solve it, but I'm just figuring to do something definite for myself. I've begun by buying a machine I should have had when I began farming. That's a fanning mill."

He got up and looked out of the window. The snow had al-

A set-up that allows one motor to shell corn and grade all kinds of seeds and deliver them in bags.

most stopped. Only an occasional flurry whirled about between the house and the broad, comfortable barns.

"It's slowing up a little," said Ed. "If you're warmed up come out and take a look at that mill. I'm going to clean all my oats before I sell them, and clean my seed grain, too. I won't have a new crop of weeds I've sowed myself anyway."

The fanning mill plays an important part in increasing future yields in more ways than one. It takes away the trash which might clog the grain drill and cause uneven seeding. It shakes out the green, shrivelled or broken kernels at the same time, leaving only plump mature grain for seed.

This means fields of heavy grain ripening uniformly. Where green and ripe seeds are sowed together, they ripen at different times. When you come to cut them, part of the grain will still be green. If you wait for the laggard heads, the riper ones will shell out and drop the grain to the ground.

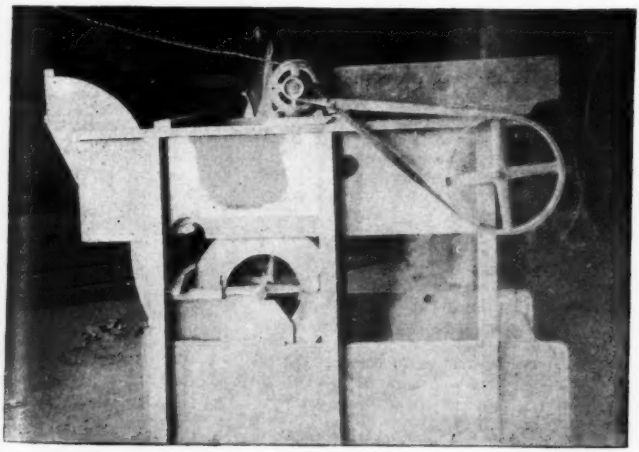
As the combine becomes more and more general, this uniform ripening will become increasingly important. The grain should all develop at the same time so it will be ready to thresh when you cut it.

Then Brown told me about a man of the neighborhood, recently moved there from Illinois, who got up at the Institute meeting to say that a fanning mill had been the secret of his father's uniform success with wheat.

"He planted only sound big grains, and he always got a bumper crop of wheat," the man said. "Our neighbors were always badgering him to tell them the secret of his success. But there was nothing mysterious about it. He just planted clean, sound seed and reaped as he sowed."

W. G. Keso of Fairwater, Wisconsin, raises many acres of excellent oats. Last year he cleaned over 1,000 bushels with the help of a small electric motor. He saved his own seed, of course, but most of that grain he sold at $1.00 a bushel when the market for ordinary grain was ranging from 50 to 60 cents.

"I know a man, E. C. Miritz, of Fond du Lac, who finds lots



The motor mounted on this particular grader is not subject to much vibration. It is a convenient installation.

of jobs for his grain grader," said Brown. "He is in a small threshing ring with an old machine. Lots of the grain drops through it. He told me that last year when they threshed at his place, he and his brother gathered up a wagon load of the grain from the ground and piled it in an empty horse stall."

"Then they moved the fanning mill down into the alley behind the horses. Nights after chores he ran the stuff through. He got fifty bushels of good, sound grain, —some wheat, some oats, some barley. But he told me he would never have cleaned it up if he'd had to do it by hand. It would have taken too long. He used a 1/6 h. p. motor to do the work."

Then he told me still another instance of the way Miritz makes the mill earn its keep around his farm.

A Unique Use

It seems that his corn drying room is over his farm shop. The big furnace that dries out the corn stands right in the shop itself. During the course of the year, chips and litter from fuels he brings in, accumulate on the floor. When he drops a bolt or tips over a box of screws on his work bench, they are pretty well sunk. So now and again he shovels up a mess of this litter and runs it through the mill, saving all the screws, nuts and washers and leaving a pile of chips to burn.

"I suppose one reason I've never had a fanning mill," said Brown, "is the fact that my brothers and I used to have to turn one at home when we were boys. We'd crank away at that old rattletrap till we thought we'd drop. Somehow Pa never really persuaded us that it was worthwhile. If we'd known what we were doing it for, we might have had some interest in it. I'm putting a motor on this mill so no one will have to crank it."

An electric motor more than takes the place of a man or a couple of boys in running the fanning mill. It drives it slightly faster than a man could drive it,—and because it does not run now fast, now slow, as a wearying man might turn it, it gives a better, because a more uniform, product. A motor has the power to run a sacker at the same time. This cuts down the labor still more, and prevents any possibility of mixing up the clean grain with the chaff and weeds that have gone through. Instead of being a tedious task for two, running the fanning mill becomes an easy one man job.

Current Consumption

A quarter horse motor will easily turn the mill, but since the time for grain cleaning comes only occasionally, it is often possible to borrow the motor from the cream separator or the washing machine temporarily. Sometimes it is more convenient to use a larger motor. —even a 5 h. p. portable. Of course a fanning mill will not use all of the power of the larger motor, but neither will it draw more current than the job demands.

Various tests made in different parts of the country show that 1 to 1⅔ K.W.H. is the average current consumption for cleaning and sacking 100 bushels of small grain.

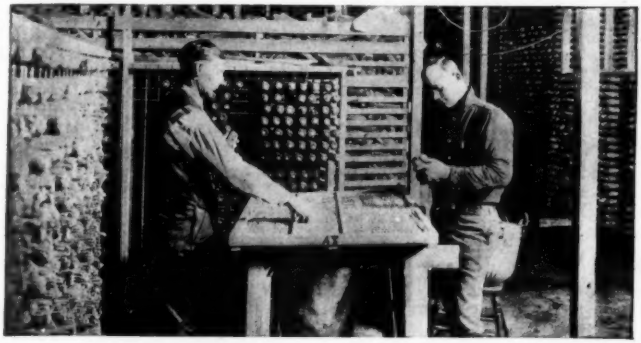
The mill and the motor need no particular set up. The mill should stand solidly on a level floor just as though it were to be cranked by hand. The pulleys must slow down the speed of the motor so it will turn the mill at the rate of a good brisk hand cranking. With the mills that shake the grain through one sieve after another it is best not to mount the motor on the frame of the mill itself. There is bound to be considerable vibration which is bad for the motor.

"What's that you call your mule?"

"I call him Corporation," answered the old colored man.

"How did you come to give him such a name?"

"Frum studyin' de animal an' readin' de papahs. Dat mule get mo' blame an' abuse dan anythin' else in de township, an' goes ahead doin' his work jes de same." —*Truth.*



Putting Kernels of Corn on Trays for Germination.

Seed Corn Testing

A Paying Practice

By E. W. LEHMANN
Head, Dept. of Farm Mechanics, University of Illinois

CROP improvement through seed corn testing, to eliminate disease and insure germination, is becoming an established practice in many sections of the Corn Belt. The results of experiments and practical demonstrations show that the use of high-grade, tested seed make a return to the corn grower in higher yields and better quality equal to at least 20 per cent of the value of the crop. There are at least five corn diseases that are most destructive in reducing the yield and quality of the corn crop. I shall not attempt to describe the symptoms and characteristics of these diseases but point out that the important fact is that these corn diseases can be detected, and the ears that are infected may be eliminated by the use of an electric seed germinator.

While seed corn has been tested for germination for a great many years, testing to eliminate disease is a relatively new procedure. The electric-heated germinator with constant temperature control, and humidity maintained at practically 100 per cent, provides ideal conditions for the symptoms of the different diseases to be readily recognized. This type of germinator has been in use in Illinois for the past four years. Professor J. C. Hackleman, in charge of extension work in Farm Crops, University of Illinois, was largely responsible for the development of the electric germinator, and he has also taken an active part in recommending it to individual farmers and to community seed associations as the best type of germinator for testing seed corn for disease.

Due to the activity of the county agricultural agents in carrying out the project on corn improvement outlined by Professor Hackleman, a demand for electric germinators of two sizes has been created—a commercial size to meet the requirements of the seed associations, and a smaller size to meet the needs of the individual farmer. Detailed plans of the small-size germinator were prepared, and

during the last few months about two hundred of these plans have been supplied to individual farmers. Anyone interested may secure one of these plans from the Farm Mechanics Department of the University of Illinois, at a cost of 20 cents.

Plans of Germinator

The plans prepared are not greatly different from the first electric germinator that was built four years ago. It was a carefully-insulated box 36"x42"x72", outside dimensions. The size box built by individual farmers has been modified according to capacity required, also as to size of doorway it should pass through. Trays on which the corn is tested are built to fit the box. Where the corn is stored and dried on racks there should be a definite relation between the size of tray and the corn racks, so the diseased ears may be easily eliminated without tagging. The trays should be made of cypress or a similar, light wood. They should be approximately 1½" deep; however, 1¼" x ¾" pieces of lumber are satisfactory for the frame. The life of the tray can be materially increased by using ¼" or ⅜" hardware cloth on the bottom. A piece of ordinary screen wire is then placed on top of the hardware cloth to support the germinating material. Some trays have been made with only screen wire tacked directly to the frame.

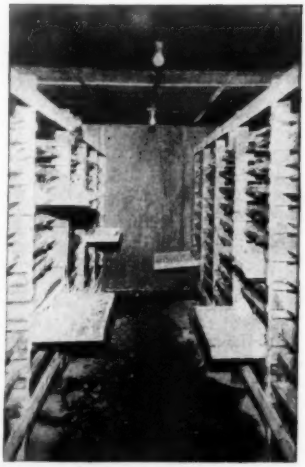
Preparing the Tray

To prepare the tray for germination a mixture of two parts of well-rotted sawdust and one part of finely-ground limestone is spread on it one inch deep. This is covered with a layer ¼" to ½" thick of a mixture of equal parts by volume of sawdust and limestone. Over this layer is spread a muslin cloth which is sterilized before using. The kernels of corn tested are placed on this cloth and then covered with a piece of burlap or gunny sacking which is also sterilized before using.

In operation five kernels of corn are taken from each ear tested and are placed on the tray at a point which corresponds to the point from which the ear is located on the drying rack. The gunny sacking is placed over the corn and is kept moist by sprinkling with water at least twice a day. The temperature should be kept at 80 degrees Fahrenheit and the humidity should be kept at as nearly the saturation point as possible.

Insulation Important

The important thing to keep in mind in constructing a germinator is to have it carefully insulated and properly protected on the inside from the high moistures required. A practical type of construction for the small-size boxes is to build the frame 2" x 4" studding and line it on the inside with Celotex or Insulite and paint it with a waterproof paint. A few small boxes have been lined with zinc or galvinized material which is made water tight by soldering the joints. Painting is less expensive and is apparently satisfactory. Dry sawdust will make a satisfactory insulating



Interior of commercial germinator at Tolono, Illinois. Corn on trays show different stages of germination.

material; however, if the box is not made waterproof and the sawdust gets wet, it is of little value. The construction of the wall of the typical box from the inside to the outside includes Celotex or Insulite coated with paint, building paper, 2 inches of dry sawdust, building paper, and tongue-and-grove siding on the outside. The door should be carefully made and special refrigerator box fasteners provided.

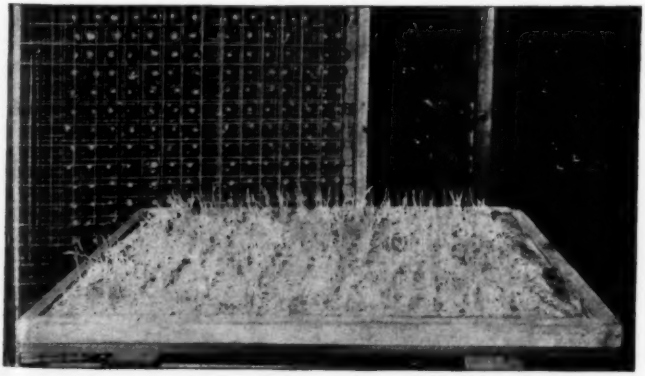
The first small boxes that were built were heated with three 100-watt electric light bulbs placed in the bottom of the box, just below a pan of water. Some trouble was experienced from the bulbs burning out. Small boxes are now being equipped with bar space heaters the same as the large germinators. One 250-watt bar space heater is all that is needed for the small sizes. The 500-watt, 220-volt space heater may be used on the 110-volt circuit and provide adequate heat. The mercuroid type thermostat is being used in most of the small germinators; however, there are bimetal type quick-acting thermostats that are giving good service, although they are not designed for the high humidity conditions.

Six cooperative seed associations in Champaign County are now using electric germinators. Interest is spreading to other counties and to other states. The seed association at Tolono, Illinois, is now using their electric germinator the third season. Groups of farmers from other sections of Illinois, as well as groups from other states, have visited the Tolono plant. John T. Smith, of Tolono, a farmer on the Illinois Test Line built one of the first small germinators at his farm and he was largely responsible for the organization of the Tolono association and the installation of the first large electric-heated germinator.

The Tolono Germinator

The Tolono germinator is a well-insulated room 10′ x 16′ x 8′, inside dimensions, built inside the seed house. It now has a capacity of 19,200 ears or 192 bushels. The trays are 32″ x 44″ and are placed on racks on each side of the germinating room. There are five tiers of these racks, each tier holding twelve trays. To secure adequate air circulation, a space 3½″ wide is provided along the side walls and ends of the room. In other words, the trays do not extend back to the wall. No air-circulating fans or special ventilation was required.

The Tolono germinator was heated with ten 500-watt electric bar space heaters, one heater being placed under each tier of



A tray of germinated seed corn. Ears on racks in background indicate method of storing seed corn in the seed house.

trays. Four inches below the bottom tray a 20" x 24" water pan was placed lengthwise, and the space heaters were placed on bricks in a lengthwise position 5½" below the water pan. By having the heaters properly spaced and providing adequate space for air circulation the trays do not dry out and there are no dead air spots in the germinator. The humidity was kept at as near 100 per cent as possible by keeping the pans full of water and by sprinkling the trays each evening. The temperature was maintained practically constant at 82 degrees Fahrenheit with a General Electric Company quick-acting bimetal thermostat used in combination with relays for closing the heating circuit.

Time of Germination

The period of germination is one week. In operating the small germinators the trays are emptied and refilled once a week; in operating the large germinators the work is continuous for five days, two tiers of trays are tested and refilled each day. Saturday is left to shell and sack the different grades tested during the week. A crew of from six to eight men are kept busy in operating the large-size germinators.

In making tests, the farmers follow the plan outlined by the Agricultural Experiment Station, testing for germination, vigor and freedom from disease. Usually only three grades are retained for seed. J. H. Junkins, of Homer, Illinois, who has a small germinator, outlined to me his practice in grading as follows: The best grade is a special grade that meets all the requirements as far as the tests are concerned. It must show 100% germination; it must be free from disease; and it must show extra vigor in growth. The next grade, which is called No. 1, must show 100% germination; it must also be free from all diseases, but it does not show the same vigor that is indicated in the special grade. The third grade, called No. 2, must show 100% germination, but there may be a slight amount of the minor diseases indicated. All ears that do not show 100% germination or show any of the major diseases are discarded.

John T. Smith of the Tolono Association informed me that the grades of corn as tested by the six associations in Champaign County are as follows: First grade, of which there is none for sale, all of it being used by the members of the association, must show 100% germination and must be free from disease. This seed would sell at $15 a bushel. The second grade, which is called N.D.F. "Nearly Disease Free" must show 100% germination. It sells for $7.00 a bushel to non-members of the association. The third grade is called "Germinated Seed." It must show from 90% to 96% germination and be free of the two major diseases and must show only a small per cent of the minor diseases. It sells for $5.00 a bushel to non-members of the association.

The cost of the electric energy for operating a germinator is a small item when compared with the results secured. The first tests to determine energy consumption were made in 1926 on Mr. Smith's small germinator which had 16-bushel capacity. It required an average of 34.4 kilowatt hours for each week it was operated, or 2.15 kilowatt hours per bushel tested. The Tolono germinator in 1927 used 3,166 kilowatt hours over a period of two months, or 2.82 kilowatt hours per bushel tested.

Mr. Junkens did some custom testing for his neighbors at 3 cents an ear or $3.00 a bushel. After deducting a labor charge he realized $58.00 a week, which he referred to as being a good return on his investment and a management wage.

The installation of an electric seed germinator should be of special interest to farmers because properly tested seed will lower the cost of production by increased yields, and it will result in higher prices because of improved quality.

Electrical Housekeeping

Conducted by GAIL MEREDITH

Washing Dishes by Machinery

ONE hot afternoon last July I visited with a charming woman in a pleasant farm home in Southern Wisconsin while my husband and hers explored the intricacies of a new hay hoist.

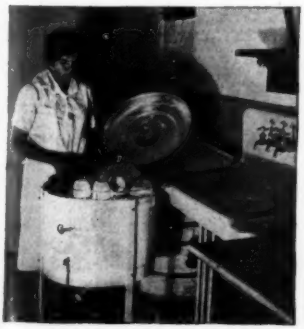
Because men must eat regardless of casual visitors, she hospitably took me out into the kitchen with her while she started supper. There I saw her beautiful electric range, her refrigerator and a modern sink with hot and cold water.

"You have certainly equipped your kitchen to make your work easy," I said admiringly. "You must have about all the labor saving machinery you need."

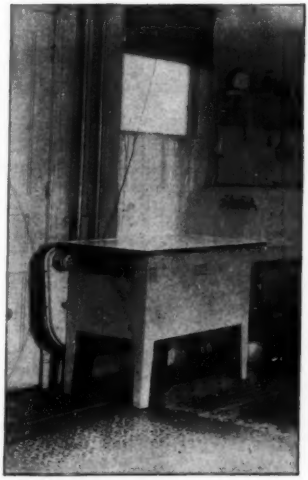
"That's what my husband thinks," laughed my hostess. "He asked me only the other night whether there was anything else I needed in the house. I came back at him quick as a wink.

"Yes sir, there is. I want an electric dish washer."

"Oh, pshaw," he answered, manlike. "We've a couple of two legged dish washers. I guess they'll be able to do that job for awhile."



Packing the dishes in.



This dishwasher is a table between meals.

My hostess nodded toward her two curly headed daughters who were at that moment resting on the steps of the porch. One of them had just come in from running the tractor on the mower; the other had been washing the car.

But curly-headed dish washers have a curious trick of out-growing the maternal dish pan. They go away to school or acquire dish pans of their own with surprising rapidity.

That gives machines a little the edge for permanence.

If my hostess had gone out to investigate the mechanical dish washers on the market today, she would have found a varied lot.

They come in all sorts of shapes and sizes. There are square ones that are tables when the lid is down; there are round ones that stand on three legs and roll about on castors; there are egg shaped ones that stand on the sink; there are built-in porcelain machines that are part of the sink itself.

These latter machines are permanently attached to the plumbing and filling and emptying them is a matter of turning a faucet or pressing a knob.

Running a dish washer has its own technique.

The first step is the same for dish pan or machinery—that is, scraping the dishes clean. After that you pack the dishes in. The silver goes into the center tray with the handles down. The hollow ware, the cups and bowls, are turned upside down so the water can get at the inside. The other dishes are arranged so the spray will strike them all over. You put the glasses in only during the final rinse.

You do not use soap in a dish washer. Soap suds, so they tell us, act as little cushions to keep the water from striking the dishes. That spoils the operation entirely. For while getting the dishes clean in a dish pan depends pretty largely on soap and friction, in the dish washing machine the action of the water does the job. The water is sloshed around by paddles or gyrators placed in the bottom of the tub. They throw powerful sprays of water over the dishes in the racks.

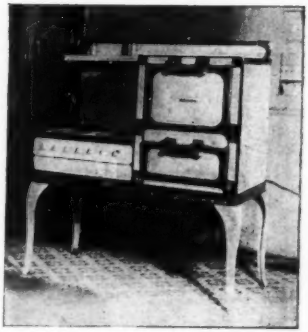
Of course, a handful of water softener dropped in with the washing powder helps the water dissolve the dirt.

Then you drain off the water while the motor is still running to keep it from leaving a greasy ring about the tub. Then you rinse off the suds with a little warm water, and finish by pouring in a couple of quarts of very hot water and running the machine one minute. That hot water makes evaporation quick, and drying the dishes is confined to wiping the silver, and perhaps the glasses if the minerals in the water leave marks on the glass.

Filling the Oven

I HAVE been learning to make full use of the oven of my electric range this last year. When I first got my stove, I used it, as many women do, just as I needed it and let it go at that. But being a frugal person, I am perfectly willing to let any ambitious kilowatt do the work of two in getting my meals, and filling up my oven instead of using its heat for one single job is a pretty good way of doing it.

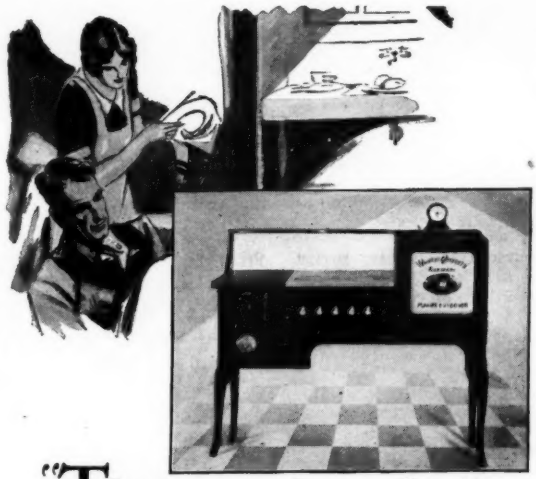
I did not discover this by myself. I don't mean that I did not realize it was true,—but I just never acted on that knowledge until I went to cooking school one afternoon. There the demonstrator



Fill up the oven of your electric range if you would utilize all its heat.

talked about the efficient use of fuel in our ovens so convincingly that I set out at once, urged on by good Scotch thrift, to plan oven meals for my family on baking days and the times when I was roasting meat anyway.

It is quite easy. About an hour before the roast comes out, I put in potatoes to bake, and a vegetable and pudding. Sometimes it is scalloped corn, sometimes baked onions or squash. Practically any vegetable can be prepared in the oven. And the puddings or custards, or baked apples that end the



"Three meals a day"
needn't be a burden

This Westinghouse range—the range with the "Flavor Zone" Oven—cooks meals all by itself. You simply prepare the food and put it in the oven. The range does the rest—cooking from start to finish without the least attention from you. Automatic control and the famous "Flavor Zone" oven lift the burden of "three meals a day" and give you hours of freedom for other things. The fuel section of this range burns either wood, coal or coke. It is provided with a water heating coil.

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Offices in all principal cities—representatives everywhere.

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Westinghouse

meal are equally various. Sometimes, of course, we have fresh fruits or canned fruits for both salad and dessert, but even then when I open that oven door, most of the dinner is ready for the table.

The meat almost always sets the time and temperature for this cooking, and we have to choose vegetables or puddings that will go along with it well.

Of course I do not try to get all my meals in the oven, but even when part of the dinner is boiling merrily on top of the stove, I find that I can often fill up my oven for coming meals, if I will use just the least little bit of forethought.

I sometimes put in a dish of dried prunes or apricots with enough water to cover the fruit,—and sugar to taste, and there is sauce for supper or the foundation of fruit whips for more ambitious desserts for future dinners.

The breakfast cereals, too, can be cooked in the oven by putting them in with three times their measure of water and letting them cook slowly with the roast.

A little planning does it, you see.

* * *

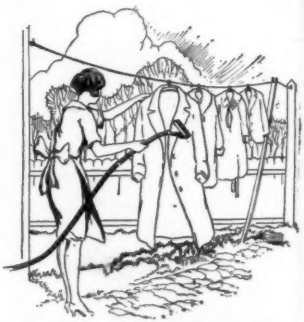
Keeping Closets Clean

MY grandmother's test of good housekeeping was the cellar stairs; my aunt's, the clothes closets. What with soft coal and all, I'd never encourage anyone to eat off my cellar stairs, but I have learned a trick or two about closets that makes them easy to keep up.

First of all, I vacuum-clean them when I do the rest of the house. I run the hose of the cleaner over the shelves, along the rods for the hangers, and down into the corners of the closet. Besides freshening up the closet, it keeps a lot of dust out of the clothes themselves. Then when they have to be done from the bottom up, I make short work of it.

First, I stretch a clothes line quite near by kitchen door and hang all of the clothes out in the sunshine. But instead of brushing them laboriously with a whisk broom, I put the suction hose on my vacuum cleaner and go over them with the brush that slides into its open nozzle. This sucks off the dust and leaves them fresh and clean.

Then I take the brush out, and go over the walls, ceiling, and the floor of the closet with the hose. It picks up the lint and dust here, too. Next I wash the walls and the shelves and the floor off with ammonia water. And because houses with central heat are never quite out of the season for moths, even in the winter, I spray the



Instead of a whisk broom.

closets with one of the commercial moth killers, those modern substitutes for the little bags of cedar shavings they used to have lying around for the discouragement of moths.

Then I set my electric fan in the closets one after another, and let it blow them dry, thoroughly and quickly.

That's all there is to it.

Next month GAIL MEREDITH **discusses vacuum cleaning, making "Journey Cake" and good coffee.**

JUST LIKE CITY WATER SERVICE

Its EASY *to pay for a* DURO *Automatic Water System*

Many farm folk have always wanted running water on their farms, and they have always promised it to their loved ones and themselves, but a water system has always seemed to them to be too expensive. The experience of Duro owners, however, is convincing proof that the Duro Water System is never an expense but an **investment** in better health, comfort and convenience for every member of the family, every day in the year.

The Duro Water System is a **money-making investment!** It **modernizes** and **protects** your farm, **increases its selling cost,** and **saves you hours and hours of valuable time and labor.**

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Please send me full information on Duro Water Systems, and free advisory service on my requirements.

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Stationary Spray Plants in the Wenatchee Valley

By J. C. SCOTT
Agriculturist

WITHIN five years a portable spray plant will be a curiosity in the Wenatchee Valley, Washington, according to Mr. A. R. Chase, county agricultural agent.

In fact there are close to one thousand stationary spray plants in operation now in the apple orchards of this valley. They are replacing the portable plants very rapidly. In 1927 only one portable plant was sold in the city of Wenatchee, while several hundred stationary plants were sold during the same season.

The stationary spray plant consists of a tank (usually about 1000 gallons capacity, or 2-600 gallon tanks), where the spray is mixed and kept agitated, a pressure pump, gas or electric motor and pipe line. It is usually a larger outfit than the portable plant.

To learn of the relative advantages and disadvantages of these two types of spray plants, one must talk to the orchardists. As to the disadvantages of the stationary plants, I could find none where the plant is properly installed. The first cost of each is about the same, when considering the longer life of the stationary plant.

But with regard to the advantages of the stationary plant, there seems to be many, which can be summarized as follows:

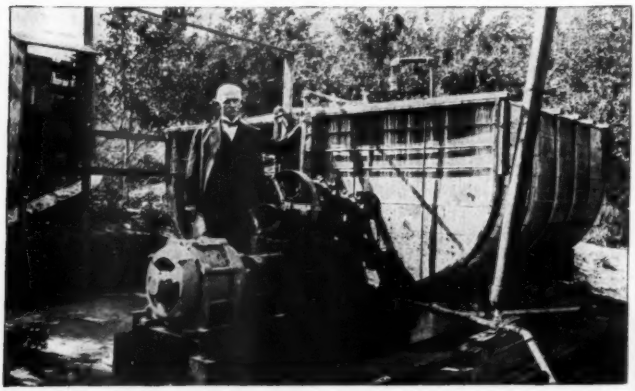
Spraying does not interfere with irrigation and irrigation does not interfere with spraying.

No damage to irrigation ditches.

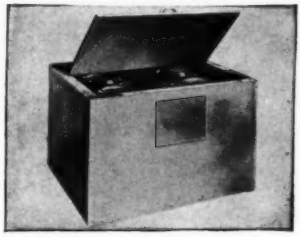
No packing of the land by driving over it when wet, which often leaves it in an unfavorable condition for best plant growth.

No injury to intercrops or cover crops by driving over them.

Spraying can be done as early in the season as necessary, regard-



Capt. Robert J. Graham With His 400-Gallon Bean Super-Quad Stationary Spray Plant, Wenatchee Valley, Wash.



Insure your milk profits with a *KELVINATOR Milk Cooler*

Kelvinator Milk Coolers have been proved to be of immense value to dairymen. Kelvinator-cooled milk is cooled properly. And properly cooled milk contains the minimum numbers of bacteria. It thus often commands premium prices in the best markets. These increased earnings, combined with the savings on rejected milk on the platform and the saving on buying ice or on the labor of harvesting, storing and handling, quickly make Kelvinator Coolers pay for themselves. And then the new profits are all clear—yours. Let us tell you of this new way of properly cooling your milk.

Kelvinator Corporation

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Facts About the KELVINATOR Milk Cooler

Kelvinator presents a revolutionary idea for the quick cooling and storing of milk in this new electric milk-cooling cabinet.

This submergible-type cooler is designed to meet a wide application to farm and dairy requirements.

This is a sturdy, well-constructed, steel-clad cabinet, insulated with pure corkboard, built to give long life.

Outlets are provided for operation of an aerator and a circulating pump can be furnished at slight additional charge.

Kelviuator brings the greatest dependability in electric refrigeration for the home.

With General Electric Motor

Your Washing Done

For the price of two 2-cent stamps

THIS is a message to every farm woman who is making the great sacrifice of health for the sake of a few cents a day.

It isn't worth the price! The day of back-breaking drudgery on the farm has passed.

The originator of the electric washing machine offers you the fastest, most modern washing machine on the market. It does *all* the work. It washes a tub-ful of clothes sparkling clean in 5 minutes. It has fewer moving parts than any washing machine on the market. No belts to slip and break—nothing to get out of order.

And this is the lowest priced quality washing machine on the market. We will gladly mail you fully illustrated booklets on all Thor products. Write to

THE HURLEY MACHINE CO.
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less of the condition of the ground.

Pests requiring quick action can be controlled without delay.

Adaptable to rough, hilly farms.

Does not injure or knock fruit off trees.

Props do not interfere with spraying.

No breaking of branches.

Tanks can be refilled quickly, which materially increases the amount of spraying per man.

Better Spraying Done

Better spraying is done, because each man works on his own natural gait, not having to keep up with the fastest worker.

Men can do work in different places and not spray each other.

Less wear and tear on machine, and no jarring out of adjustment, as with the portable machine.

The power cost is less.

One of the most important advantages of the stationary plant is its adaptability to electrical power.

Spraying Apple Orchard in the Wenatchee Valley.

The hose and pipe line shown here is a part of the stationary spray plant, which is operated by electric motor.

Ellis Haynes, Dansville, Mich., who uses an electrically driven De Laval Milker and other electrical equipment, with the assistance of H. J. Gallagher, agricultural engineering specialist, kept an accurate account of the cost of various farm operations for one year. It was found that a gross savings of $136.88 had been made, in addition to the increased pleasure and satisfaction derived from the operation of this modern equipment. Mail coupon for full information.

Electrically Operated DE LAVAL Separators and Milkers

For Greater Profit and Pleasure in Dairying

De Laval Separators and Milkers can be furnished with electric motor equipment and are ideally suited for operation by this form of power. Electricity is an extremely economical and dependable source of power for operating De Laval machines, and electrically equipped De Lavals have done much to increase the pleasure and profit in dairying. No one who has ever operated an electrically driven separator or milker has the slightest desire to go back to other methods.

De Laval "Golden Series" Separators are known the world over for their durability and clean skimming. They are the standard by which cream separators are judged and in every dairy section of the world they are earning greater profits for their users.

The De Laval Milker has earned an equally impressive reputation for itself, milking over 1,250,000 cows in every section of the world, saving time and labor, enabling each cow to produce to the maximum, and making the production of clean milk easier.

De Laval Separators and Milkers now in use may be equipped for operation by electricity easily and at small cost.

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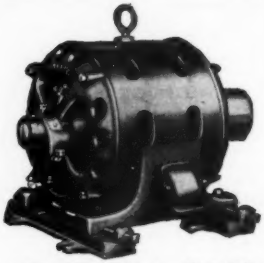

5 Horse Power Century Type RS Repulsion Start Induction Single Phase Motor

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40 U. S. and Canadian Stock Points and More than 75 Outside Thereof

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YOURS Upon Request

The booklets, catalogs and descriptive leaflets listed below can be secured without cost by writing directly to the addresses given and mentioning that you saw them described in ELECTRICITY ON THE FARM.

"Has Your Iron a Built-in Watchman?" is the title of an interesting little folder published by Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

"Looking Into the Future" will provide you some interesting information on electric incubating and brooding and can be secured from the Wellington J. Smith Co., Cleveland, Ohio.

"Grind Feed Into Profits This Way" tells of the ease and advantages of electric feed grinding. Write I. B. Rowell Co., Waukesha, Wis.

"Water in Abundance" is a book giving full details on electric water systems and can be obtained from F. E. Myers & Bro. Co., Ashland, Ohio.

Individual Water Systems are described in a book obtainable from the Milwaukee Air Power Pump Co., Milwaukee, Wis.

Feed Grinders, 2 to 5 h.p., are described in a catalog offered by Prater Pulverizer Co., 817 W. Washington Blvd., Chicago, Ill.

Electric Poultry Farming is fully described in a booklet obtainable from the Oaks Mfg. Co., Tipton, Ind.

How to Electrify Your Sewing Machine is told in a booklet offered by Hamilton Beach Mfg. Co., Racine, Wis.

Water When You Want It and How to Get It is described in a folder published by the Jaun Lauson Mfg. Co., New Holstein, Wis.

How to be Your Own Wood Worker will be explained by the Tornau Machine Co., Cincinnati, Ohio.

"All You Need to Make a Modern Laundry" is the title of a folder published by Hurley Machine Co., Chicago, Ill.

(*See page 32*)

Write for Information about this HAVEN Farm Milk Cooling System

Let us give you the full details about this electrically operated farm milk cooling system—

A system that is so simple that anyone can install it;

That requires only a water tank of the correct size and capacity (supplied by us when necessary);

That operates **without** belts, chains, or valves.

A system with a small, compact, dependable, efficient cooling and power unit which may be installed or removed from tank without disconnecting any pipes.

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(A few good dealer territories still open.)

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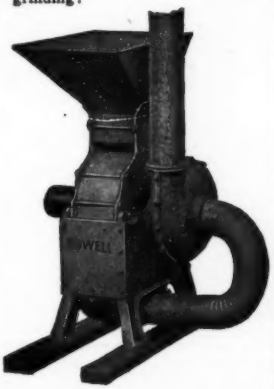
A Feed Mill for Small, Single Phase Motors—

Here is a practical, light-running, efficient feed mill especially designed for operation by 5 H.P. single phase motors. Lower cost per bushel than with any other type or method of grinding!



The Rowell Electric Hammer-Mill is entirely automatic in operation and it grinds with ***hammers*** instead of plates or burrs. Actually does a better job of grinding—***pounds*** the grain into feed, making it more digestible than by ordinary methods. Can also be equipped with ear-corn feeder.

A quality machine throughout. Runs on New Departure Ball Bearings. Built to Rowell high quality standards. Meets every requirement of the small grinder as specified by the University of Wisconsin.

Write for illustrated descriptive literature and prices.

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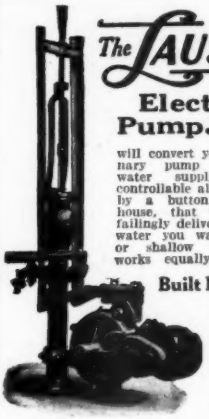

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will convert your ordinary pump into a water supply unit, controllable all weather by a button in the house, that will unfailingly deliver all the water you want—deep or shallow well, it works equally well.

Built Like a High Grade Auto Transmission

Machine cut hardened gears, fully enclosed, running in oil. Bronze bearings. No chains or sprockets. High grade motor. Compare with all others. Write for special literature and prices.

Also complete Water Systems

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Electric BROODER

For the sixth successive year the *marvel* of the brooding world. Owners claim it to be "the world's best brooder."

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Exclusive patented features. Saves time. Saves labor. Ends fire risks. Clean, economical. Automatic heat control. Gives long, satisfactory service. Get yours NOW at local hatchery, hardware store, or from us.

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☐ Send Free Folder.

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What is Your Title for the Cover?

ELECTRICITY ON THE FARM offers a $25.00 cash prize for the best title for the picture shown on the cover of this issue (February).

RULES OF CONTEST

1. Contest closes March 5.

2. Contestant must be a farmer or a member of his family *living on the farm.*

3. Only one title may be submitted by each contestant.

4. In case of a tie, each winning contestant will receive $25.00.

5. Print plainly your name and address, and send your suggestion to Title Editor, ELECTRICITY ON THE FARM, 225 West 34th Street, New York, N. Y.

6. The winner for February will be announced in ELECTRICITY ON THE FARM for April.

Readers submitting titles must include a brief statement of what electricity is doing for him (or her), and what it can do.

SAWS the handiest time and labor saving tools for the farm workshop

Bench and Combination

WOOD WORKERS put up your own buildings—make your own furniture.

Be ready for quick repairs

Write

KORNAU MACHINE COMPANY
Vandalia Street, Cincinnati, Ohio

Here's the Winning Cover Title for December

"Electric toys have brought to boys
The things that even Dad enjoys."

Mrs. Theo. Abraham,
Medina, Wis.

AND the following deserve special commendation:

"Dad's rejuvenation, Rover's elimination!" Mrs. Geo. W. Lautenschlager, Swanton, Nebr.; "Dad thinks he's so electro-cute, But Junior protests and et tu Brute," Mrs. R. W. Curren, R. D. Elmira, N. Y.; "When run by electricity a Christmas toy, Delights the father as well as the boy," Miss Julia Smith, Port Orchard Wash.; "Christmas joys, twenty years delayed," Mrs. William Cording, R. F. D. 3, Elizabeth, Ill.; "Daddy, pays and Daddy plays," Miss Pearl Sproesser, R. D. 1, Shoemakersville, Pa.; "It's lots of fun Sonny's missin' When he has to Stop! Look! and Listen!" Mrs. A. M. Boddicker, Watkins, Ia.; "I just can't help but stand and pout, I'll not get my train while Dad's about," Mrs. F. Shoup, R. 1, Ripley, Okla.; "Wanted—Another Electric Train." Mrs. Wm. Trainer, Jr., R. D. 2, Douglassville, Pa.; "Back to boyhood again, by the electric train," Miss Edna Grooms, Owens Cross Road, Wis.; "Electricity knows only eternal youth," Mrs. E. J. Staten, R. 1, Clarkamas, Oreg.; "His first lesson in electrical engineering," Mrs. W. L. Smith, R. 2, Howell, Mich.; "The son's fingers itch —dad's at the switch," Mrs. M. G Rager, Sumner, Wash.

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No. 5—Prater Mill—(5 horse power) complete with automatic feeder and one screen ....$75.00 (Use this size with your portable motor)

Grind Feed with the PRATER MILL

Grind feed at home when you want it. Advanced principles — thoroughly tested and proven — make possible the remarkable performance of the Prater Automatic Feed Mill.

In capacity, low power requirements and high quality of grinding, it has no equal among the 2 to 5 horse power mills. This is more than a claim — it is a guarantee.

Ask your experiment station or any Prater Mill owner about our mills.

See your local dealer or power company or send to us for free booklet. Mail coupon today.

Prices:

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No. 3 (3 horse power)	54.25
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Please send me your catalog on 2 h.p. to 5 h.p. Feed Grinders.
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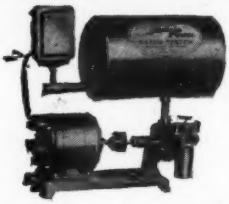

ONLY $58

for the completely automatic water system shown here. Ideal for shallow wells and cisterns where water is within 22 ft. of the surface. Only two moving parts.

Many other sizes and styles of water systems, also septic tanks, water softeners, stock drinking cups, etc. Write for complete descriptive literature.

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Clipped and Groomed Cows during stable months are clean and comfortable and keep the dirt out of the milk pail.
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Use a GILLETTE Portable Electric Clipping and Grooming Machine. Operates on the light circuit furnished by any Electric Light & Power Co., or on any make of Farm Lighting Plant.

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ELECTRICITY and a DAYTON Water System will provide your farm with the greatest convenience of all —*Running Water.*

DAYTON Water Systems are made in a complete range of capacities for deep and shallow wells.

Write for details.

The Dayton Pump & Mfg. Company

Pioneer Makers of Private Water Systems

The DAYTON Unisystem made in four sizes. **Dayton, Ohio, U.S.A.**

YOURS
Upon Request

(*Continued from page 28*)

Milk Cooling with simple economical equipment is explained in Bulletin B. Write Haven Mfg. Co., Milwaukee, Wis.

Electric Clipping and Grooming, advantages and economy, is described in a booklet published by the Gillette Clipping Machine Co., New York City.

Simplified Electric Refrigeration is explained in a folder obtainable from the General Electric Co., Refrigeration Dept., Cleveland, Ohio.

"Electric Servants for the Modern Home" is the name of a folder obtainable from Edison Electric Appliance Co., Chicago, Ill.

Data on Water System Requirements can be secured from the Duro Co., Dayton, Ohio.

"Carefree Service," an interesting little folder on water systems, can be obtained from the Decatur Pump Co., Decatur, Ill.

A Complete Line of Residence Water Systems is described in a folder put out by Delco-Light Co., Dayton, Ohio.

Rural Home Lighting Information can be secured from the Chapman Lighting Studios, Chicago, Ill.

Complete Pump Jack Specifications can be secured from the Acme Machine Co., Minneapolis, Minn.

CLASSIFIED ADVERTISING

FOR SALE—General Electric alternating current 60 cycle new motors with pulley: **Single phase** ¼ H.P.—$9.45; ½ H.P.—$24.90; ¾ H.P.—$30.90; 1 H.P.—$39.75; 2 H.P.—$59.00; 3 H.P.—$77.85. **Three phase** 3 H.P.—$45.90; 5 H.P.—$55.80. Other bargains, new and rebuilt. Tell us your needs. Complete repair department. HYRE ELECTRIC COMPANY, 617 So. Dearborn St., Chicago.

FOR SALE—New Lighting Equipment designs now ready. All modern decorative effects at Reasonable Prices. Mail layout of rooms and we will submit free suggestions with our latest catalog. "Rural Homes Dept." CHAPMAN LIGHTING STUDIOS, 640 West Lake St., Chicago.

CLIP YOUR COWS ELECTRICALLY

The New STEWART STOCKMAN

is a powerful, smooth-running, quiet machine. Will give years of low cost service. Supplied for any specified current, from socket or lighting plant. Quickly pays for itself. Priced as low as $45.00.

Other clipping machines as low as $14.00.

More Profit From Your Cows

Clipped cows give more milk, richer in butter fat. Clipped cows are easiest to clean—their milk is cleaner and stays sweet longer. Tests show increased profit as high as $1.40 per month per cow.

Ask Your Dealer — Or Write for FREE Catalog

Chicago Flexible Shaft Company
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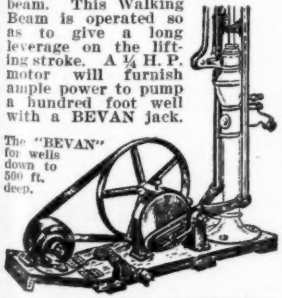
39 Years Making World's Best Clipping and Shearing Machines

BEVAN Roller Bearing Pump Jacks

Fresh, running water, always available—without the tiresome labor of pumping. That's why BEVAN Electric Pumping Units are installed in so many rural homes soon as Electricity takes over the pumping job.

BEVAN jacks have a patented method of conveying motion to the pump by means of a walking beam. This Walking Beam is operated so as to give a long leverage on the lifting stroke. A ¼ H. P. motor will furnish ample power to pump a hundred foot well with a BEVAN jack.



The "BEVAN" for wells down to 500 ft. deep.

Write for complete specifications.

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Electrify your sewing machine

Stop back aches

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Make 2 dresses while now making 1. Pays for itself in a few days' use. Electricity cost less than 1c an hour. Pedal gives absolute control of sewing speed. The Home Motor with attachments also mixes cake, whips cream, beats eggs, sharpens knives, polishes silverware or runs electric fan.

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If you have a treadle sewing machine, send for free booklet telling how the 1,000,000 Hamilton Beach sewing motors now in use save hundreds of hours' work and make housework a joy. Price is very low. Mail coupon today —NOW.

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Without obligation, please send booklet explaining how Home Motor saves me many hours of work every week at a saving which pays for motor in few days.

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Also a vital factor in satisfactory trouble-free service and low maintenance cost, is a pump mechanically suitable for the most exacting requirements. The Burks Super Turbine is such a pump. Expert engineers have told us it is mechanically perfect. Has only one moving part—no friction bearing surfaces to wear, cause grief, necessitate replacement and expense—in fact there is no metal to metal contact of moving parts and *therefore no wear*. This wonderful piece of essential farm equipment is durable, reliable and efficient to the extreme.

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Only one moving part
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